

Comparative Analysis of Offshore Pipeline Reliability Using Degradation Analysis and PF Interval Models

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Abstract

Offshore pipelines play an important role in oil and gas industry where they transport crude oil in large quantity. However, the increasing age of the pipelines has raised concerns among pipeline operators throughout the world due to offshore pipelines are typically operated in deteriorative environment, hence affecting the pipeline integrity. The pipeline wall thickness loss due to internal corrosion is a major potential problem and it becomes worse as the pipeline ages. In order to overcome this problem, pipeline operators have practiced reliability-based corrosion management programs, consisting of three components in managing their pipeline which are in-line inspection, pipeline reliability evaluation and pipeline repair. Two common approaches have been used to determine the pipeline reliability; deterministic and probabilistic methods. In this study, both methods are being explored using intelligent pigging data. The models were ASME B31G, degradation analysis and PF interval. Degradation analysis has been widely used in reliability analysis of piping systems; however, the application to offshore pipelines by using intelligent pigging data is rather limited. The results were compared to the results generated from ASME B31G which is normally being used by most pipeline operators. The results showed that the degradation analysis is more conservative than ASME B31G and P-F interval.

Keywords

Intelligent Pigging data, PF interval, degradation analysis, offshore pipeline reliability

Biography

Ainul Akmar Mokhtar is a Senior Lecturer in Mechanical Engineering Department and Programme Manager for MSc in Asset Management and Maintenance, Universiti Teknologi Petronas (UTP). Prior to joining UTP, she worked with Seagate Technology (M) Sdn Bhd as a process engineer. She obtained her first degree, BSc in Industrial Engineering from Purdue University, USA. She pursued her postgraduate study in MSc in Manufacturing Systems from Nottingham University, UK and PhD in Mechanical Engineering from UTP. Her PhD research title was "Failure Probability Modelling for Piping Systems subject to Corrosion under Insulation".